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(54) **Detergent composition**

Waschmittel-Zusammensetzung

Composition détergente

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EP 0 999 260 B1

Description

Related Application

[0001] This application claims the priority of Japanese Patent application No. 10-285269 filed on October 7, 1998, No. 10-285270 filed on October 7, 1998, and No. 10-285271 filed on October 7, 1998, which are incorporated herein by reference.

Background of the Invention

1. Field of the invention

[0002] The present invention relates in general to a detergent composition, and more particularly to a detergent composition which foams well and does not leave a slimy feeling after use.

2. The Prior Art

[0003] Conventionally, alkyl sulfates have been used as detergents in products such as cleansing foam, body shampoo and shampoo because of their foaming quality and usability. Particularly, since hair washed with alkyl sulfates do not have a squeaky feeling, they have been used as the base agents of shampoos for a long time. They are also used in cleansing foam and body shampoo, not as the main base agent but as an assistant agent to increase foaming because they cause a slimy feeling during use. The range of applications for alkyl sulfates will extend even more if a refreshing feeling can be added to it.

[0004] Document JP 06 033094 A relates to a detergent composition, which contains an N-acyl taurine type anionic surfactant and a beta-alanine type amphoteric surfactant, which provides high foaming with creamy foam, stimulates the skin little and conditions the hair well.

[0005] Document JP 01 178596 A relates to a detergent composition, which comprises an anionic surfactant of alkyloyl-alkyltaurine salt and a nonionic surfactant, which provides low irritation on the skin and high quality foam and high foaming activity.

[0006] Document JP 08 1839993 A relates to a detergent composition, which contains a long-chain acyl taurine salt-type anionic surfactant and an alkyl aminoacid-type amphoteric surfactant, which is suitable for cleaning the skin and hair.

[0007] Document JP 09 316486 A relates to a detergent composition, which contains a salt derived from an alkali metal or organic base salt of taurine, N-methyltaurine or hypotaurine and a hydroxy fatty acid, alkyl ether carboxylic acid, hydroxyalkyl ether carboxylic acid, acylated aminoacid, glycerol ether carboxylic acid or ester carboxylic acids.

[0008] Document JP 05 256829 A relates to a detergent composition, which contains an acyl alkyl taurine salt type anionic surfactant, at least one amido aminoacid type amphoteric surfactant and at least one trialkyl aminoacetic acid betaine type amphoteric surfactant and amido betaine type amphoteric surfactant, a cationic surfactant.

[0009] Document JP 05 311193 A relates to a composition, which contains an acyl alkyl taurine salt type anionic surfactant, at least one amido aminoacid type amphoteric surfactant and at least one amino acetic acid betaine type amphoteric surfactant and amido betaine type amphoteric surfactant, which do not stimulate the skin and foam well.

[0010] Document JP 06 172785 A relates to a detergent composition, which contains at least an acyl alkyl taurate type anionic surfactant, acyl isethionate type anionic surfactant and amido ether sulphate type anionic surfactant and an alkyl iminodicarboxylate type amphoteric surfactant.

Brief Summary of the Invention

[0011] As described above, since alkyl sulfates have the superior characteristic of good foaming, if a refreshing feeling is added to them, they can be used as the main base agent for detergents other than shampoos to obtain detergents with good foaming.

[0012] The object of the present invention is to provide a detergent composition which has good foaming and does not leave a slimy feeling after use.

[0013] That is, the present invention provides a detergent composition which contains as an essential ingredient an alkali metal N-methyltaurate salt or an organic alkali N-methyltaurate salt of a N-acylmethyltaurine represented by the following general formula 1-(1).

$$R\text{-}CO\text{-}N(CH_3)\text{-}CH_2\text{-}CH_2\text{-}SO_3^-H_2N^+(CH_3)\text{-}CH_2\text{-}CH_2\text{-}SO_3^-X^+ \quad 1\text{-}(1)$$

(In this formula, R denotes a saturated or unsaturated hydrocarbon group with a carbon number of 7-23 and X denotes an alkali metal or an organic alkali.)

[0014] Also, the present invention provides a detergent composition which contains as an essential ingredient an alkali metal N-methyltaurate salt or an organic alkali N-methyltaurate salt of a N-acyltaurine represented by the following general formula 1-(2).

$$R\text{-}CO\text{-}NH\text{-}CH_2\text{-}CH_2\text{-}SO_3^-H_2N^+(CH_3)\text{-}CH_2\text{-}CH_2\text{-}SO_3^-X^+ \quad 1\text{-}(2)$$

(In this formula, R denotes a saturated or unsaturated hydrocarbon group with a carbon number of 7-23, and X denotes an alkali metal or an organic alkali.)

[0015] Also, the present invention provides a detergent composition which contains as an essential ingredient an alkali metal N-methyltaurate salt or an organic alkali N-methyltaurate salt of an alkylsulfuric ester represented by the following general formula 1-(3).

$$R\text{-}O\text{-}SO_3^-H_2N^+(CH_3)\text{-}CH_2\text{-}CH_2\text{-}SO_3^-X^+ \quad 1\text{-}(3)$$

(In this formula, R denotes a saturated or unsaturated hydrocarbon group with a carbon number of 7-23 and X denotes an alkali metal or an organic alkali.)

[0016] Also, the. present invention provides a detergent composition which contains as an essential ingredient an alkali metal N-methyltaurate salt or an organic alkali N-methyltaurate salt of an alkyl ether sulfuric ester represented by the following general formula
1-(4).

$$R\text{-}O\text{-}(CH_2CH_2O)_nSO_3^-H_2N^+(CH_3)\text{-}CH_2\text{-}CH_2\text{-}SO_2^-X^+ \quad 1\text{-}(4)$$

(In this formula, R denotes a saturated or unsaturated hydrocarbon group with a carbon number of 7-23, n denotes an integer 1-40, and X denotes an alkali metal or an organic alkali.)

[0017] Also, the present invention provides a detergent composition which contains as an essential ingredient an alkali metal N-methyltaurate salt or an organic alkali N-methyltaurate salt of an alkylsulfonic acid represented by the following general formula 1-(5).

$$R\text{-}SO_3^-H_2N^+(CH_3)\text{-}CH_2\text{-}CH_2\text{-}SO_3^-X^+ \quad 1\text{-}(5)$$

(In this formula, R denotes a saturated or unsaturated hydrocarbon group with a carbon number of 7-23 and X denotes an alkali metal or an organic alkali.)

Detailed Description of the Invention

[0018] The present invention is described in detail below.

[0019] In the compounds blended, as an essential ingredient, into the detergent composition of the present invention represented by the above general formulas 1-(1)-(5), R denotes a saturated or unsaturated hydrocarbon group with a carbon number of 7-23. Specific examples include linear saturated hydrocarbon groups such as a heptyl group, octyl group, nonyl group, decyl group, undecyl group, dodecyl group, tridecyl group, tetradecyl group, pentadecyl group, hexadecyl group, heptadecyl group, octadecyl group and tetraeicosyl group, branched saturated hydrocarbon groups such as a 2-ethylheptadecyl group and 2-ethylpentyl group, linear unsaturated hydrocarbon groups such as a 8-heptadecenyl group, oleyl group and 4,6-octadecadiethenyl group, and branched unsaturated hydrocarbon groups such as a 2-methyloctadeca-6-ethenyl group.

[0020] In the aforementioned general formulas 1-(1)-(5), X denotes an alkali metal such as sodium, potassium or lithium, or an organic alkali such as triethanol amine, diethanol amine or lysine.

[0021] Specific examples of the compounds blended, as an essential ingredient, into the detergent composition of

the present invention represented by the above general formulas 1-(1)-(5); examples are given below for each general formula.

General formula 1-(1): Sodium N-methyltaurate M-lauroylmethyltaurate, Triethanol amine N-methyltaurate N-lauroylmethyltaurate
General formula 1-(2) : Sodium N-methyltaurate N-lauroyltaurate, Triethanol amine N-methyltaurate N-lauroyltaurate
General formula 1-(3) : Sodium N-methyltaurate laurylsulfuric ester, Triethanol amine N-methyltaurate laurylsulfuric ester
General formula 1-(4): Sodium N-methyltaurate polyoxyethylenelauryl ether sulfuric ester, Triethanol amine N-methyltaurate polyoxyethylenelauryl ether sulfuric ester
General 1 formula 1-(5): Sodium N-methyltaurate laurylsulfonate, Triethanol amine N-methyltaurate laurylsulfonate

[0022] The blend ratio of the compounds blended, as an essential ingredient, into the detergent composition of the present invention represented by the above general formulas 1 (1)-(5) is preferably 0. 5-90 wt%. A more preferable blend ratio range is 5-40 wt%; by using a det ergent composition prepared within this range, the effect of the present invention can be more clearly obtained. If the blend ratio is 0.5 wt% or less, then the effect of the present invention is hard to obtain. It is not preferable to have a blend ratio of more than 90 wt%, because then problems arise such as a reduction of the solubility in water.

[0023] Preparation methods of the compounds blended, for an. essential 1 ingredient, into the detergent composition of the present invention represented by the above general formulas 1-(1)-(5) include a method in which N-acylmethyltaurine, N-acyltaurine, alkylsulfuric ester, alkyl ether sulfuric ester, or alkylsulfonic acid is dissolved at a temperature of approximately 80°C and an aqueous solution of the alkali metal N-methyltaurate salt or the organic alkali N-methyltaurate salt is added to it while being stirred, or an aqueous solution of the N-methyltaurine and an aqueous solution of the other alkali are separately added to it while being stirred.

[0024] The detergent composition of the present invention refers to a composition which has a cleaning effect on objects. The range of objects to be cleaned is not limited. Preferably, it refers to a detergent used on human bodies, such as cosmetics and quasi-drugs. In addition to the aforementioned essential ingredients, other ingredients which are u.sually contained in a detergent composition can also be blended in, including anionic surfactants such as soap, a alkylsulfuric ester (salt), polyoxyethylenealkyl ether sulfuric acid (salt) and hydroxyalkyl ether carboxylic acid (salt), ampholytic surfactants such as imidazoline type ampholytic surfactants and betaine type ampholytic surfactants, nonionic surfactants such as a polyoxyethylene alkyl ether, polyoxyethylene fatty acid ester, sucrose fatty acid ester, alkylglycoside and maltitolhydroxy aliphatic ether, cationic surfactants such as trimethylalkyl ammonium chloride, humectants such as glycerine, 1,3-butylene glycol and dipropylene glycol, extracts of plants such as Swertia japonica, Paeonia lactiflora, Iris florentina and Horsetail (Equisetum), drugs such as tranexamic acid and arbutin, perfumes and preservatives.

Examples

[0025] The present invention is further described in detail below. The present invention is not limited to these examples.

(Testing)

[0026] The compounds represented by the aforementioned general formulas 1-(1)-(5) were subjected to a foaming test and an actual use test.

1. Foaming test with the shaking method"

[0027] 0.5 wt% of each sample in Table 1 was dissolved in ion exchanged water with 70 ppm calcium chloride already dissolved in it. The pH was then adjusted to 7. 0 with hydrochloric acid. This solution was kept at 30°C and 20ml of it was put into a Nessler's tube with an inner diameter of 3 cm and a height of 20 cm equipped with a sliding plug, and then tilted 90 degrees every second using a pendulum shaker. After one minute, the sample was taken out of the shaker and the foam height was measured. The time required for the foam height to be reduced to half of the .original height (duration) was also measured.

(Sensory test of actual use)

[0028] Fifty panelists were used to conduct the actual use test. 10 ml of a 10% aqueous solution of each sample was put on a hand and the hand was washed for 30 seconds. The feeling during use and after rinsing was rated with a five point scale based on the criteria shown in Table 1. The average of the fifty panelists was calculated to obtain the total evalution.

[Table 1]

Evaluation point	Foaming	Sliminess after use
5	Considerably good	Considerably refreshing
4	Somewhat good	Somewhat refreshing
3	Average	Average
2	Somewhat poor	Somewhat slimy
1	Considerably poor	Considerably slimy

◎ : The average of the evaluation points is 4-5.
○ : The average of the evaluation points is 3-3. 9.
Δ : The average of the evaluation points is 2-2. 9.
× : The average of the evaluation points is 1-1. 9.

1. EXAMPLES

(Test samples 1 and 2, control samples 1-3)

[0029] Using the compounds shown in Table 2 (test samples 1 and 2 are, respectively, the compounds represented by the general formulas (1) and (2)), the foaming test and the actual use test were carried out for each sample. The results are shown in Table 3.

[Table 2]

Sample No.	Compound name
Test sample 1	Sodium N-methyltaurate N-lauroylmethyltaurate
Test sample 2	Triethanol amine N-methyltaurate N-lauroylmethyltaurate
Control sample 1	Sodium N-lauroylmethyltaurate
Control sample 2	Potassium N-lauroylmethyltaurate
Control sample 3	Triethanol amine N-lauroylmethyltaurate

[Table 3]

	Results of the foaming test		Results of the actual use test	
	Foam height (cm)	Duration (min)	Foaming	Sliminess after use
Test sample 1	15.8	200	◎	○
Test sample 2	16.0	150	◎	◎
Control sample 1	11.5	40	○	×
Control sample 2	12.0	50	○	Δ
Control sample 3	13.0	70	◎	×

(Test samples 3 and 4, control samples 4-6)

[0030] Using the compounds shown in Table 4 (test samples 3 and 4 are, respectively, the compounds represented by the general formulas (3) and (4)), the foaming test and the actual use test were carried out for each sample. The results are shown in Table 5.

[Table 4]

Sample No.	Compound name
Test sample 3	Sodium N-methyltaurate N-lauroyltaurate
Test sample 4	Triethanol amine N-methyltaurate N-lauroyltaurate
Control sample 4	Sodium N-lauroyltaurate
Control sample 5	Potassium N-lauroyltaurate
Control sample 6	Triethanol amine N-lauroyltaurate

[Table 5]

	Results of the foaming test		Results of the actual use test	
	Foam height (cm)	Duration (min)	Foaming	Sliminess after use
Test sample 3	14.8	310	◎	○
Test sample 4	13.0	280	◎	○
Control sample 4	10.5	60	○	×
Control sample 5	11.5	40	○	Δ
Control sample 6	11.0	75	○	Δ

(Test samples 5 and 6, control samples 7-9)

[0031] Using the compounds shown in Table 6 (test samples 5 and 6 are, respectively, the compounds represented by the general formulas (5) and (6)), the foaming test and the actual use test were carried out for each sample. The results are shown in Table 7.

[Table 6]

Sample No.	Compound name
Test sample 5	Sodium N-methyltaurate laurylsulfuric ester
Test sample 6	Triethanol amine N-methyltaurate laurylsulfuric ester
Control sample 7	Sodium lauroylsulfuric ester
Control sample 8	Potassium lauroylsulfuric ester
Control sample 9	Triethanol amine lauroylsulfuric ester

[Table 7]

	Results of the foaming test		Results of the actual use test	
	Foam height (cm)	Duration (min)	Foaming	Sliminess after use
Test sample 5	20.5	340	◎	◎
Test sample 6	19.0	300	◎	○
Control sample 7	18.0	100	◎	×

[Table 7] (continued)

	Results of the foaming test		Results of the actual use test	
	Foam height (cm)	Duration (min)	Foaming	Sliminess after use
Control sample 8	14.0	150	ⓞ	×
Control sample 9	13.9	90	ⓞ	×

(Test samples 7 and 8, control samples 10-12)

[0032] Using the compounds shown in Table 8 (test samples 7 and 8 are, respectively, the compounds represented by the general formulas (7) and (8)), the foaming test and the actual use test were carried out for each sample. The results are shown in Table 9.

[Table 8]

Sample No.	Compound name
Test sample 7	Sodium N-methyltaurate polyoxytethylenelauryl ether sulfuric ester
Test sample 8	Triethanol amine N-methyltaurate polyoxytethylenelauryl ether sulfuric ester
Control sample 10	Sodium polyoxytethylenelauryl ether sulfuric ester
Control sample 11	Potassium polyoxytethylenelauryl ether sulfuric ester
Control sample 12	Triethanol amine polyoxytethylenelauryl ether sulfuric ester

[Table 9]

	Results of the foaming test		Results of the actual use test	
	Foam height (cm)	Duration (min)	Foaming	Sliminess after use
Test sample7	16.5	250	ⓞ	ⓞ
Test sample 8	15.0	300	ⓞ	ⓞ
Control sample 10	10.0	80	ⓞ	×
Control sample 11	12.0	100	ⓞ	×
Control sample 12	9.8	75	○	×

(Test samples 9 and 10, control samples 13-15)

[0033] Using the compounds shown in Table 10 (test samples 9 and 10 are, respectively, the compounds represented by the general formulas (9) and (10)), the foaming test and the actual use test were carried out for each sample. The results are shown in Table 11.

[Table 10]

Sample No.	Compound name
Test sample 9	Sodium N-methyltaurate laurylsulfonate
Test sample 10	Triethanol amine N-methyltaurate laurylsulfonate
Control sample 13	Sodium laurylsulfonate
Control sample 14	Potassium laurylsulfonate
Control sample 15	Triethanol amine laurylsulfonate

[Table 11]

	Results of the foaming test		Results of the actual use test	
	Foam height (cm)	Duration (min)	Foaming	Sliminess after use
Test sample 9	22.5	470	ⓞ	ⓞ
Test sample 10	19.0	390	ⓞ	○
Control sample 13	14.0	120	ⓞ	×
Control sample 14	13.5	95	ⓞ	×
Control sample 15	15.8	70	ⓞ	×

[0034] The above results indicate that the test samples, comparedi with the control samples, have superior foaming and duration of foam and do not give rise to sliminess after use.

[0035] Specific examples of the detergent composition pertaining to the present invention are shown below. The blend ratios are expressed in weight percent units.

"Example 1" Shampoo

[0036]

		wt%
(1)	Ethylene glycol fatty acid ester	2.0
(2)	Sodium N-methyltaurate N-lauroylmethyltaurate	10.0
(3)	Dodecyl maltoside	5.0
(4)	Laurylsulfobetaine	10.0
(5)	Diethanolamide laurate	5.0
(6)	Propylene glycol	2.0
(7)	Coloring agent, perfume	Appropriate amount
(8)	Purified water	Balance

(Preparation method)

[0037] Purified water was heated up to 70°C, the other ingredients were added to it and dissolved homogeneously, then it was cooled.

"Example 2" Shampoo

[0038]

		wt%
(1)	Sodium cocoylmethyl taurate	8.0
(2)	Triethanolamine N-methyltaurate laurylsulfuric ester	20.0
(3)	Diethianol amide of coconut fatty acid	4. 0
(4)	Perfume	Appropriate amount
(5)	EDTA·2Na	Appropriate amount
(6)	Purified water	Balance

(Preparation method)

[0039] Purified water was heated up to 70°C, the other ingredients were added to it and dissolved homogeneously, then it was cooled.

"Example 3" Body shampoo

[0040]

		wt%
(1)	Glycerine	5.0
(2)	Potassium N-methyltaurate polyoxyethylenelauryl ether sulfuric ester	5.0
(3)	Myristic ester of sucrose	1.0
(4)	Triethanolamine laurate	10.0
(5)	Sodium laurylsulfonsuccinate	5. 0
(6)	Diethanol amide of coconut oil	3. 0
(7)	Chelating agent	0.1
(8)	Coloring agent, perfume	Appropriate amount
(9)	Purified water	Balance

(Preparation method)

[0041] Purified water was heated up to 70°C, the other ingredients were added to it and dissolved homogeneously, then it was cooled.

"Example 4" Liquid soap

[0042]

		wt%
(1)	Lauric acid	3.0
(2)	Myristic acid	7.0
(3)	Palmitic acid	3.0
(4)	Oleic acid	2. 5
(5)	Lauroyldiethanolamide	6.0
(6)	Propylene glycol	11.0
(7)	Erythritol	4.0
(8)	Sodium N-methyltaurate N-lauroylmethyltaurate	10.0
(9)	Sucrose	5.0
(10)	Sodium hydroxide	3.0
(11)	EDTA	0.1
(12)	Perfume	Appropriate amount
(13)	Purified water	Balance

(Preparation method)

[0043] Purified water was heated up to 70°C, the other ingredients were added to it and dissolved homogeneously, then it was cooled.

"Example 5" Liquid detergent for clothes

[0044]

		wt%
(1)	Sodium POE (3 moles) lauryl ether sulfate	10. 0
(2)	Maltotritol dodecyl ether	30.0
(3)	Sodium N-lauroyltaurate	15.0
(4)	Distearyldimethylammonium chloride	2.0

(continued)

		wt%
(5)	Bleach	Appropriate amount
(6)	Purified water	Balance

(Preparation method)

[0045] Purified water was heated up to 70°C, the other ingredients were added to it and dissolved homogeneously, then it was cooled.

"Example 6" Shampoo

[0046]

		wt%
(1)	Sodium N-methyltaurate N-lauroylmethyltaurate	10.0
(2)	Sodium cocoyl amide propyldimethyl glycine	5.0
(3)	Coconut fatty acid monoethanol amide	2.0
(4)	Cationized cellulose	0.3
(5)	Chelating agent	Appropriate amount
(6)	Preservative	Appropriate amount
(7)	Perfume	Appropriate amount
(8)	Purified water	Balance

(Preparation method)

[0047] Purified water was heated up to 70°C, the other ingredients were added to it and dissolved homogeneously, then it was cooled.

"Example 7" Body shampoo

[0048]

		wt%
(1)	Sodium N-methyltaurate N-lauroylmethyltaurate	3.0
(2)	Sodium N-methyltaurate laurate	5.0
(3)	Lauric acid	1. 0
(4)	Myristic acid	4. 0
(5)	Palmitic acid	2.0
(6)	Potassium hydroxide	1.5
(7)	Coconut fatty acid monoethanol amide	2.0
(8)	Glycerine	5.0
(9)	Chelating agent	Appropriate amount
(10)	Preservative	Appropriate amount
(11)	Perfume	Appropriate amount
(12)	Purified water	Balance

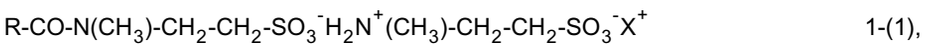
(Preparation method)

[0049] Purified water was heated up to 70°C, the other ingredients were added to it and dissolved homogeneously, then it was cooled.

[0050] All of Examples 1-7 have superior foaming properties, are free fromsliminess after use, and have superior usability.

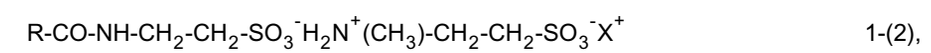
Claims

1. A detergent composition which contains as an essential ingredient an alkali metal N-methyltaurate salt or an organic alkali N-methyltaurate salt
of a N-acylmethyltaurine represented by the following general formula 1-(1),



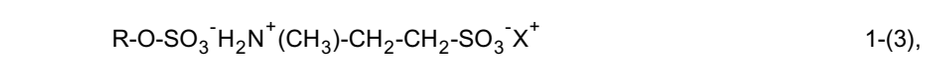
1-(1),

or of a N-acyltaurine represented by the following formula 1-(2),



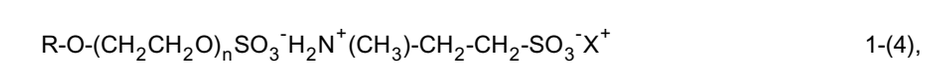
1-(2),

or of an alkylsulfuric ester represented by the following general formula 1-(3),



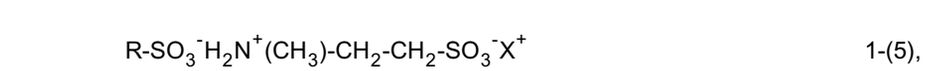
1-(3),

or of an alkyl ether sulfuric ester, represented by the following general formula 1-(4),



1-(4),

or of an alkylsulfonic acid represented by the following general formula 1-(5),

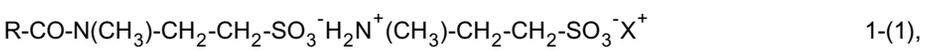


1-(5),

wherein in these formulae, R denotes a saturated or unsaturated hydrocarbon group with a carbon number of 7-23, X denotes an alkali metal or an organic alkali, and n denotes an integer 1-40, respectively.

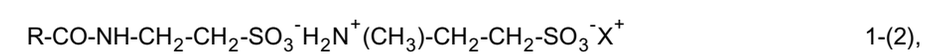
Patentansprüche

1. Detergenszusammensetzung, enthaltend als einen wesentlichen Bestandteil ein Alkalimetall-N-methyltauratsalz oder ein organisches Alkali-N-methyltauratsalz
eines N-Acylmethyltaurins der folgenden allgemeinen Formel 1-(1),



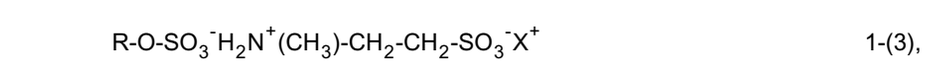
1-(1),

oder eines N-Acyltaurins der folgenden Formel 1-(2),



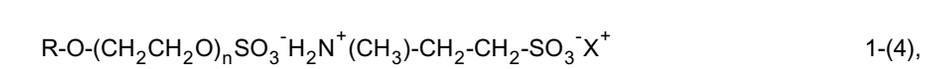
1-(2),

oder eines Alkylschwefelsäureesters der folgenden allgemeinen Formel 1-(3),



1-(3),

oder eines Alkyletherschwefelsäureesters der folgenden allgemeinen Formel 1-(4),



1-(4),

oder einer Alkylsulfonsäure der folgenden allgemeinen Formel 1-(5),

$$R\text{-}SO_3^-H_2N^+(CH_3)\text{-}CH_2\text{-}CH_2\text{-}SO_3^-X^+ \quad 1\text{-}(5),$$

wobei in diesen Formeln R eine gesättigte oder ungesättigte Kohlenwasserstoffgruppe mit einer Kohlenstoffanzahl von 7-23 bedeutet, X ein Alkalimetall oder ein organisches Alkali bedeutet, und n eine ganze Zahl von 1-40 bedeutet.

Revendications

1. Composition détergente qui contient à titre d'un de ses ingrédients essentiels un sel N-méthyltaurate de métal alcalin ou un sel N-méthyltaurate d'une base organique d'une N-acylméthyltaurine représentée par la formule générale suivante 1-(1),

$$R\text{-}CO\text{-}N(CH_3)\text{-}CH_2\text{-}CH_2\text{-}SO_3^-H_2N^+(CH_3)\text{-}CH_2\text{-}CH_2\text{-}SO_3^-X^+ \quad 1\text{-}(1)$$

ou d'une N-acyltaurine représentée par la formule générale suivante 1-(2),

$$R\text{-}CO\text{-}NH\text{-}\ CH_2\text{-}CH_2\text{-}SO_3^-H_2N^+(CH_3)\text{-}CH_2\text{-}CH_2\text{-}SO_3^-X^+ \quad 1\text{-}(2)$$

ou d'un ester alkylsulfurique représenté par la formule générale suivante 1-(3),

$$R\text{-}O\text{-}SO_3^-H_2N^+(CH_3)\text{-}CH_2\text{-}CH_2\text{-}SO_3^-X^+ \quad 1\text{-}(3)$$

ou d'un ester sulfurique d'éther alkyle, représenté par la formule générale suivante 1-(4),

$$R\text{-}O\text{-}(\ CH_2\ CH_2O)_n\ SO_3^-H_2N^+(CH_3)\text{-}CH_2\text{-}CH_2\text{-}SO_3^-X^+ \quad 1\text{-}(4)$$

ou d'un acide alkylsulfonique représenté par la formule générale suivante 1-(5),

$$R\text{-}SO_3^-H_2N^+(CH_3)\text{-}CH_2\text{-}CH_2\text{-}SO_3^-X^+ \quad 1\text{-}(5),$$

dans laquelle, dans ces formules, R représente un groupe hydrocarbure saturé ou insaturé avec un nombre de carbone de 7 à 23, X représente un métal alcalin ou une base organique, et n représente un nombre entier de 1 à 40, respectivement.